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MILLENN, WHITE, ZELANO & BRANIGAN, P.C.			EXAMINER	
2200 CLARENDRON BLVD.			SCHECHTER, ANDREW M.	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	08/627,386	BAUR ET AL.
	Examiner ANDREW SCHECHTER	Art Unit 2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(o).

Status

1) Responsive to communication(s) filed on 16 December 2008.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) See Continuation Sheet is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) See Continuation Sheet is/are allowed.

6) Claim(s) 125-143 is/are rejected.

7) Claim(s) 144, 145, 152 and 161 is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 18 December 2006 is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

- 1) Certified copies of the priority documents have been received.
- 2) Certified copies of the priority documents have been received in Application No. 08/466,068.
- 3) Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____

4) Interview Summary (PTO-413)
Paper No(s)/Mail Date _____

5) Notice of Informal Patent Application

6) Other: _____

Continuation of Disposition of Claims: Claims pending in the application are 20,27,30-32,37,41,47-49,58,59,61,70,79,80,97,99,101-103,119, and 125-189.

Continuation of Disposition of Claims: Claims allowed are 20,27,30-32,37,41,47-49,58,59,61,70,79,80,97,99,101-103,119,146-151,153-160 and 162-189.

DETAILED ACTION

Response to Arguments

1. The indication of allowable subject matter in the previous claim 41 is withdrawn.

The previous statement of allowability, from page 15 of the office action of 1 July 2008, was clearly in error. It stated: "Claims 41, 102-104, 123, and 124 recite ranges of β_0 for which the applicant's evidence of unexpected results distinguishes over Soref and its teachings." This is valid for claims 102-104, 123, and 124, but claim 41 recites a range for the initial twist angle β , rather than for the orientation angle β_0 . The recited range for the initial twist angle β in the previous claim 41 clearly does not distinguish over the 90 degree twist angle disclosed in Soref. The examiner presumably confused β and β_0 when considering claim 41, and the error unfortunately escaped the applicants' notice as well, since they incorporated this limitation into new claims 125-145. The following new grounds of rejections for claims 125-143, and objections to claims 144 and 145, are therefore necessary.

2. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

3. Claims 20, 27, 30-32, 119, 125, 126, 146, and 188 are objected to because of the following informalities: in the inequalities for α_o , the symbol " \leq " has been replaced by a period "." (in some cases twice in a single claim). Appropriate correction is required.

4. Claim 48 is objected to because of the following informalities: " $\Delta n \square d/\lambda$ " should be " $\Delta n \cdot d/\lambda$ ". Appropriate correction is required.

5. Claim 152 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

β_0 is already excluded from being 45° by the limitations of the independent claim. Note that if claim 152 is cancelled, claims 148-151, 153-160, and 162 depend from it.

Double Patenting – Duplicate Claims

6. Claim 161, which depends on claim 20, is objected to under 37 CFR 1.75 as being a substantial duplicate of multiply-dependent claim 79 when claim 79 depends on claim 20. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

It appears to the examiner that claim 161 may have been intended to depend from claim 146, or from claim 147, or be multiply-dependent from any one of claim 146, 147, 152, 163, or 164.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 125-130 and 132-140 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Soref*, "Field effects in nematic liquid crystals obtained with interdigital electrodes", Journal of Applied Physics, vol. 45, no. 12, (1974) [*Soref JAP*] with evidence of inherency provided by *Soref*, "Interdigital Twisted-Nematic Displays", Proceedings of the IEEE, pp. 1710-1711, (1974) [*Soref IEEE*], with further evidence of inherency provided by *Cognard*, "Alignment of Nematic Liquid Crystals and Their Mixtures" (made of record by the applicant) and *Uchida and Seki*, "Surface Alignment of Liquid Crystals" in Liquid Crystals Applications and Uses, ed. Bahadur (1992), in view of official notice.

Soref JAP describes a device whose additional properties are described in *Soref IEEE* (see the first paragraph of *Soref IEEE*). *Soref IEEE* is therefore cited as providing evidence of inherency (for the device of *Soref JAP*) of the properties which are referred

to in *Soref IEEE*; the two references are collectively referred to as *Soref* where the distinction is not critical.

Soref discloses [see Figs. 1 and 3 of *Soref JAP*, for instance] an electro-optical device comprising a liquid crystal switching element comprising a liquid crystal layer comprising liquid crystal molecules and having a surface for display of an image which is switched under control of an electric field having a predominant component parallel to said surface, wherein said liquid crystal molecules have a pretilt angle α_o caused by an 80 Angstrom film of silicon monoxide deposited at 85° incidence [*Soref IEEE*, 2nd paragraph], which results in a pre-tilt angle ranging from about 15° to about 40° [Cognard, Table VI and Uchida and Seki, p. 22]. This range overlaps the recited range of $0^\circ \leq \alpha_o < 30^\circ$ with sufficient specificity that one of ordinary skill in the art would expect the same properties to occur, so in the opinion of the examiner it anticipates the recited range [see MPEP 2131.03]. *Soref* also discloses an orientation angle β_o such that $0^\circ < \beta_o < 90^\circ$ [β_o is labeled θ_A in Fig. 3 and *Soref IEEE* explicitly discloses using $\beta_o = 45^\circ$, last paragraph of p. 1710]. The initial twist angle β of the liquid crystal molecules is 90° [*Soref IEEE*, 2nd paragraph], which is within the recited range of within 15 degrees of 0° or within 15 degrees of 90°.

Soref does not disclose a plurality of such switching elements; instead it discloses only a single on-off switching element (note that the claimed "switching element" should be thought of as an LCD pixel, rather than as a TFT, for instance). The examiner takes official notice that having a plurality of such switching elements in a display device was well-known at the time of the invention. It would have been obvious

to one of ordinary skill in the art at the time of the invention to form a plurality of such switching elements in the display device, motivated by the desire to have a plurality of pixels which can thereby form a useful image. Claim 125 is therefore unpatentable.

Considering the additional limitations of claim 126, there are liquid crystal molecules which are twistable, a substrate, an electrode structure as recited, a polarizer and a voltage source as recited, and an orientation layer [formed of silicon monoxide], in contact with at least one surface of the liquid crystal layer, aligning the liquid crystal molecules whereby they have the recited orientation angle β_0 , so claim 126 is also unpatentable.

The range of $\alpha_0 = 15^\circ$ to 40° was discussed previously as being disclosed by Soref in view of Cognard and Uchida and Seki. The examiner takes official notice that one of ordinary skill in the art would have expected the same behavior for pre-tilt angles in the range of $\alpha_0 = 0^\circ$ to 15° [see the discussions in Cognard and Uchida and Seki, for instance]; in the opinion of the examiner at present, the applicant's argument for unexpected results does not appear to specifically relate to the ranges of the pre-tilt angle; that is, it does not show that use of any of the recited ranges of pre-tilt angle provides unexpected results over the prior art showing a different range. A *prima facie* case of obviousness therefore exists [see MPEP 2144.05], so claims 127-130 are also unpatentable.

There is an analyzer, so claim 132 is also unpatentable. The axis of switching-effective twisting of the liquid crystal molecules is substantially perpendicular to the plane of the substrate, so claim 134 is also unpatentable. The examiner takes official

notice that use an active matrix or thin film transistor matrix was well known in the art; it would have been obvious to one of ordinary skill in the art at the time of the invention to do so in order to obtain good image quality, so claims 135 and 137 are also unpatentable. Similarly the examiner takes official notice for the time multiplex method; it would have been obvious to one of ordinary skill in the art at the time of the invention to use the time multiplex method, to obtain a good display by standard driving methods, so claim 136 is also unpatentable. The examiner also takes official notice that having the initial orientation of liquid crystal molecules along the polarizer and having the polarizer and analyzer parallel or perpendicular is well known [actually, this is made explicit in *Soref IEEE*], and it would have been obvious to one of ordinary skill in the art at the time of the invention to arrange them so, motivated by the desire to control the light polarizations using the conventional arrangement; having the liquid crystal molecules perpendicular to the polarizer is an art-recognized equivalent, so claim 138 is also unpatentable. Similarly, the examiner takes official notice that positive retardation (Δ nd) less than 4λ , using polymer in the liquid crystal, and birefringent optical compensation were well-known, and they would have been obvious to one of ordinary skill in the art at the time of the invention either due to conventionality, to improve the display quality, or produce certain types of LCDs with known advantages; claims 133, 139, and 140 are therefore unpatentable.

9. Claims 131 and 141-143 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Soref JAP*, *Soref IEEE*, *Cognard*, *Uchida and Seki*, in view of official notice as applied above, and further in view of *Soref IEEE*.

Soref does not disclose the particular angle β_o shown in Fig. 3. In the absence of specific arguments that the claimed ranges of β_o have unexpected advantages over other values, the examiner relies on the evidence of *Soref IEEE* that “[in] general, the nematic director at the electroded plate can have an arbitrary orientation in the xy plane” which evidences that the different possible values of β_o are considered art-recognized equivalents.

In the opinion of the examiner, the applicant has provided sufficient evidence of unexpected results for the ranges $0^\circ < \beta_o \leq 20^\circ$ and $70^\circ \leq \beta_o < 90^\circ$ compared to the prior art (*Soref*) values of 0° and 90° , respectively. Claims incorporating these ranges are therefore indicated as allowable over *Soref*. In the opinion of the examiner, the specification and evidence submitted so far do not yet make a persuasive case for unexpected results beyond the prior art results [including the value of $\beta_o = 45^\circ$ disclosed by *Soref*] for the range $20^\circ < \beta_o < 70^\circ$. Claims 131 and 141-143 are therefore unpatentable.

Allowable Subject Matter

10. Claims 144 and 145 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
11. Claims 20, 27, 30-32, 37, 41, 47-49, 58, 59, 61, 70, 79, 80, 97, 99, 101-103, 119, 146-151, 153-160, and 162-189 are allowed.

12. The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not disclose the device of independent claims 20 and 119, in particular the additional limitation that the liquid crystal layer has an untwisted structure in its initial orientation and can be reoriented to a twisted structure by the parallel field component. (*Soref*'s electric field causes the liquid crystal across the entire layer to orient along the electric field as shown in the bottom of Fig. 3, not to form a twisted structure.) Claims 20 and 119 are therefore allowed, as are their dependent claims 27, 30-32, 37, 41, 47-49, 58, 59, 61, 70, 79, 80, 97, 99, and 101-103. (Note that claim 161 would be allowable, but is objected to above as being a duplicate of multiply dependent claim 79 when it depends on claim 20.)

Claims 143 and 144 recite ranges of β_o for which the applicant's evidence of unexpected results distinguishes over *Soref* and its teachings. These claims would therefore be allowable if rewritten appropriately.

The prior art does not disclose the devices of claims 146 or 147, in particular the additional limitation reciting ranges of β_o for which the applicant's evidence of unexpected results distinguishes over *Soref* and its teachings. Claims 146 and 147 are therefore allowed, as are their dependent claims 148-151, 153-160, and 162-164. (Note that claim 152 would be allowable, but is objected to above.)

The prior art does not disclose the devices of claims 165 and 166, in particular the additional limitation that the said α_o and β_o values impart to the image a small viewing angle dependence wherein the variation of the degree of light transmission (1-

fmin/fmax) is, over all ϕ values, below about 0.57 when θ is up to 45°. [The examiner's understanding of the phrase "that the said α_0 and β_0 values impart", and of the claim language regarding having a pretilt angle and an orientation angle "which prevent domain formation" or "which reduce domain formation", is that the small viewing angle dependence and prevention or reduction of domain formation would not be obtained in the device in question were other values of α_0 and β_0 to be chosen.] Claims 165 and 166 are therefore allowed, as are their dependent claims 167-189.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (571) 272-2302. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Andrew Schechter/
Primary Examiner, Art Unit 2871
Technology Center 2800
11 March 2009